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## Agricultural Research Institute, Pusa

Are Camels Susceptible to Blackquarter,  
Haemorrhagic Septicaemia and Rinderpest?

BY

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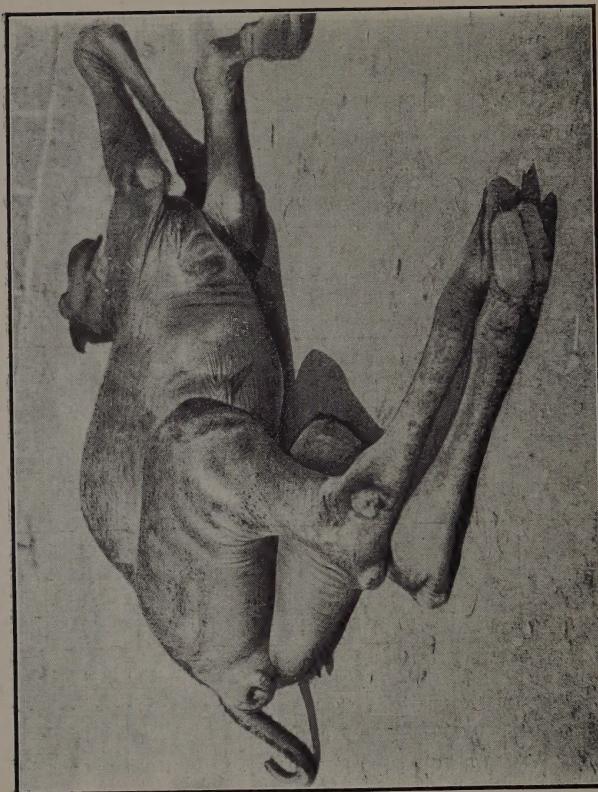
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SWELLING OF HIND QUARTERS IN BLACKQUARTER.

# Are Camels Susceptible to Blackquarter, Haemorrhagic Septicaemia and Rinderpest?

[Received for publication on the 23rd January, 1918.]

## BLACKQUARTER.

THOUGH such outbreaks of blackquarter as occur among cattle have not been reported amongst camels, deaths from this disease are occasionally stated to occur, but no reliable information regarding the disease in camels is available. To determine the susceptibility of camels to blackquarter, three camels (two—1 year old, and one—7 years old) were inoculated with blackquarter virus; one young buffalo and one calf acting as controls.

The accompanying charts show the course that the disease runs in the camel. The first symptom is a rise of temperature followed by suspension of rumination and loss of appetite. The camel is then noticed to show a disinclination to stand and when walked is noticed to go lame. After the first appearance of stiffness a swelling soon appears on the shoulder or the hindquarters (according to whether the injection of the virus has been made in the muscles of the shoulder or hind-quarters); the swelling is at first slight but rapidly increases in size and becomes emphysematous. Breathing becomes difficult accompanied by grunts. After the swelling has become large the camel lies on his side, and is unable to get up; the breathing becomes more difficult and may be rapid or slow, the face has an agonized look and the temperature falls rapidly before death takes place. On post-mortem the only lesion is the large emphysematous swelling; when cut into, the muscles of the affected part are dark brown to blackish in colour and of a slightly rancid odour and emphysematous.

2 SUSCEPTIBILITY OF CAMELS TO BLACKQUARTER, RINDERPEST, ETC.

Camel No. 2. Female, 1 year old, inoculated with 5 c.c. of emulsion of blackquarter muscle intramuscularly, died 38½ hours after inoculation.

Days of Disease	1	2	3	
TEMPERATURE FAHRENHEIT	AM. P.M.	AM. P.M.	AM. P.M.	
108°				
107°				
106°				
105°				
104°				
103°				
102°				
101°				
100°				
99°				
98°				
97°				
96°				
95°				

INOCULATED 5 C.C. OF EMULSION OF BLACKQUARTER MUSCLE INTRAMUSCULARLY AT 7:30 P.M.

OFF FEED, SWELLING ON SHOULDER, OFF FEED, SWELLING ON HIND QUARTER MUSCLE INTRAMUSCULARLY AT 10:30 P.M.

LIVING DOWN, BIG SWELLING, ANUS SWOLLEN

DEED AT 10:45 P.M.

GET UP

OFF FEED, TREMBLING AND LAME.

OFF FEED, SWELLING, UNABLE TO STAND

LIVING DOWN, BIG SWELLING, ANUS SWOLLEN

Camel No. 1. Male, 1 year old, inoculated with 5 c.c. of emulsion of blackquarter muscle intramuscularly, died 37½ hours after inoculation.

Days of Disease	1	2	3	
TEMPERATURE FAHRENHEIT	AM. P.M.	AM. P.M.	AM. P.M.	
108°				
107°				
106°				
105°				
104°				
103°				
102°				
101°				
100°				
99°				
98°				
97°				
96°				
95°				

INOCULATED 5 C.C. OF EMULSION OF BLACKQUARTER MUSCLE INTRAMUSCULARLY AT 9:30 P.M.

BIG SWELLING ON SHOULDER, OFF FEED, SWELLING ON HIND QUARTER MUSCLE INTRAMUSCULARLY AT 10:30 P.M.

OFF FEED, SWELLING ON SHOULDER, OFF FEED, SWELLING ON HIND QUARTER MUSCLE INTRAMUSCULARLY AT 10:30 P.M.

LIVING DOWN, BIG SWELLING, ANUS SWOLLEN

DEED AT 10:45 P.M.

GET UP

SUSCEPTIBILITY OF CAMELS TO BLACKQUARTER, RINDERPEST, ETC. 3

*Camel No. 3.* Male, 7 years old, inoculated with 5 c.c. of emulsion of blackquarter muscle intramuscularly, died 63½ hours after inoculation.

DAYS OF DISEASE	1	2	3	4
TEMPERATURE FAHRENHEIT	A.M.	P.M.	A.M.	P.M.
108°				
107°				
106°				
105°				
104°				
103°				
102°				
101°				
100°				
99°				
98°				
97°				
96°				
95°				

INOCULATED 6 5.C.C. OF EMULSION OF BLACK QUARTER MUSCLE  
INTRA MUSCULARLY AT 7.30 P.M.

FEEDING WELL, NOT STIFF

OFF FEED, LYING DOWN, BIG SWELLING.

DIED AT 11 A.M.

4 SUSCEPTIBILITY OF CAMELS TO BLACKQUARTER, RINDERTEST, ETC.

*Control No. 1.* Buffalo, 3 months old, male, inoculated with 5 c.c. of emulsion of blackquarter muscle intramuscularly, died 23½ hours after inoculation.

Days of Disease	1		2		3	
Temperature Fahrenheit 108°	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
107°						
106°						
105°						
104°						
103°						
102°						
101°						
100°						
99°						
98°						
97°						
96°						
95°						

INOCULATED 6 S.C. OF 5 C.C. OF EMULSION OF BLACKQUARTER MUSCLE INTRAMUSCULARLY AT 7:30 P.M.

Very stiff bending, off feed, rapid breathing, difficulty in getting up

Dea. at 7 P.M.

*Control No. 2.* Calf, male, 9 months old, inoculated with 5 c. c. of emulsion of blackquarter muscle intramuscularly, died 45½ hours after inoculation.

Days of Disease	1		2		3	
Temperature Fahrenheit 108°	A.M.	P.M.	A.M.	P.M.	A.M.	P.M.
107°						
106°						
105°						
104°						
103°						
102°						
101°						
100°						
99°						
98°						
97°						
96°						
95°						

INOCULATED 6 S.C. OF EMULSION OF BLACK QUARTER MUSCLE  
INTRAMUSCULARLY AT 7.30 P.M.

*Conclusion.* Camels are as susceptible to blackquarter as cattle.

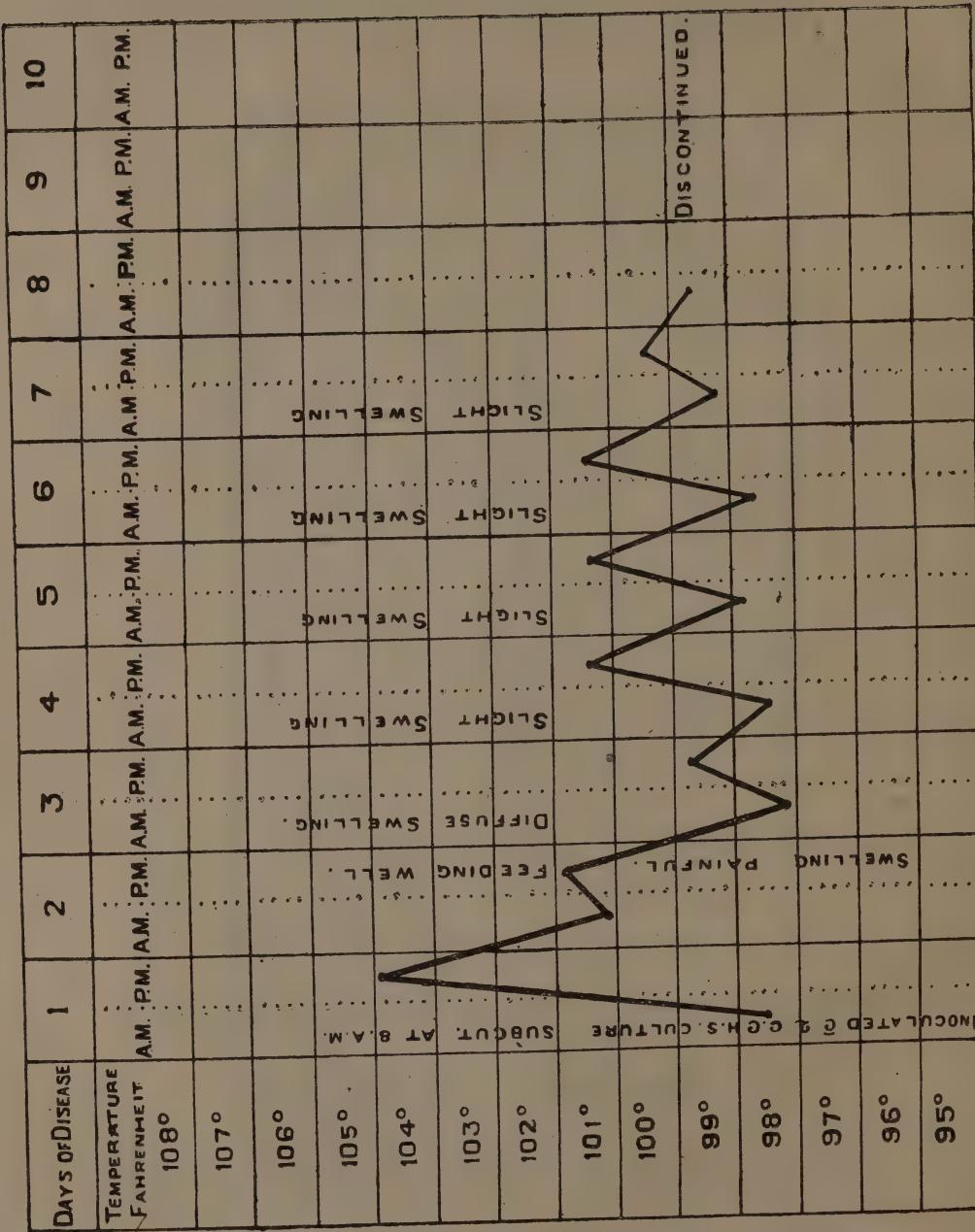
#### HÆMORRHAGIC SEPTICÆMIA.

In India the losses amongst cattle from hæmorrhagic septicæmia are very great, but it is not known whether deaths from this disease occur amongst camels.

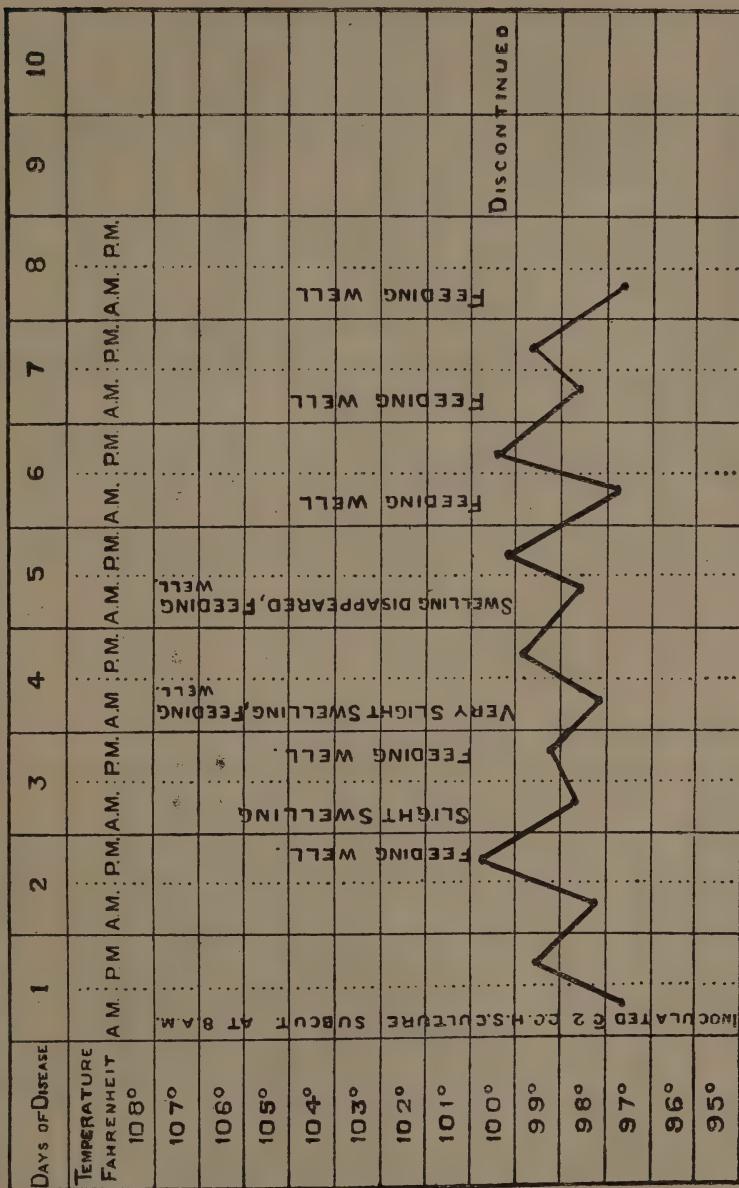
To determine whether camels are susceptible to this disease 2 camels were inoculated with hæmorrhagic septicæmia culture and 2 calves and 2 rabbits acted as controls.

## 6 SUSCEPTIBILITY OF CAMELS TO BLACKQUARTER, RINDERPEST, ETC.

Camel No. 1. Male, 1 year old, inoculated with 2 c.c. hemorrhagic septicemia culture spontaneously. Ten hours after inoculation the temperature rose to 104.8°. Thirty-four hours after inoculation there was a slight swelling, hot and painful, this gradually subsided; the rashes confirmed normal and the camel continued to feed well. Seventy-four hours after inoculation the temperature became normal, and continued so till the 7th day, after which no further observations were made, the camel being in a normal state of health.



Camel No. 2. Male, 7 years old, inoculated with 2 c.c. hemorrhagic septicaemia culture subcutaneously. Thirty-four hours after inoculation showed a very slight rise in temperature. Forty-eight hours after inoculation a slight swelling appeared at the seat of inoculation but disappeared after 2 days. The camel fed well the whole time. He was kept under observation for 7 days.



## SUSCEPTIBILITY OF CAMELS TO BLACKQUARTER, RINDERPEST, ETC.

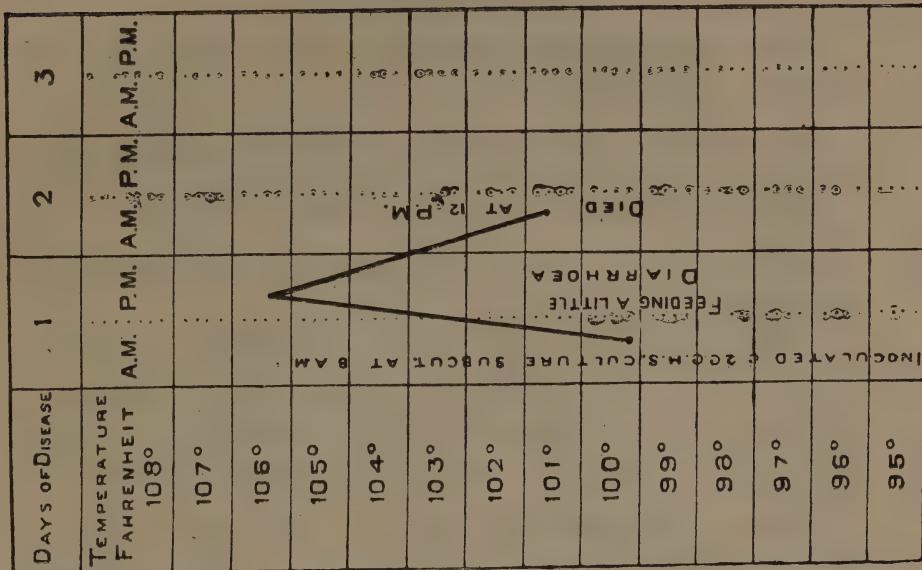
*Control No. 2.* Rabbit, inoculated with 0.5 c.c. of haemorrhagic septicemia culture subcutaneously, died in 22 hours.

Days of Disease	1	2	3	
TEMPERATURE FAHRENHEIT	A.M. P.M.	A.M. P.M.	A.M. P.M.	
108°				
107°				
106°				
105°				
104°				
103°				
102°				
101°				
100°				
99°				
98°				
97°				
96°				
95°				
INOCULATED (0.5 C.C. H.S. CULTURE SUBCUT.)				
DIED AT 6 A.M.				
SC.G.H.S. CULTURE SUBCUT. AT 8 A.M.				
108°				
107°				
106°				
105°				
104°				
103°				
102°				
101°				
100°				
99°				
98°				
97°				
96°				
95°				

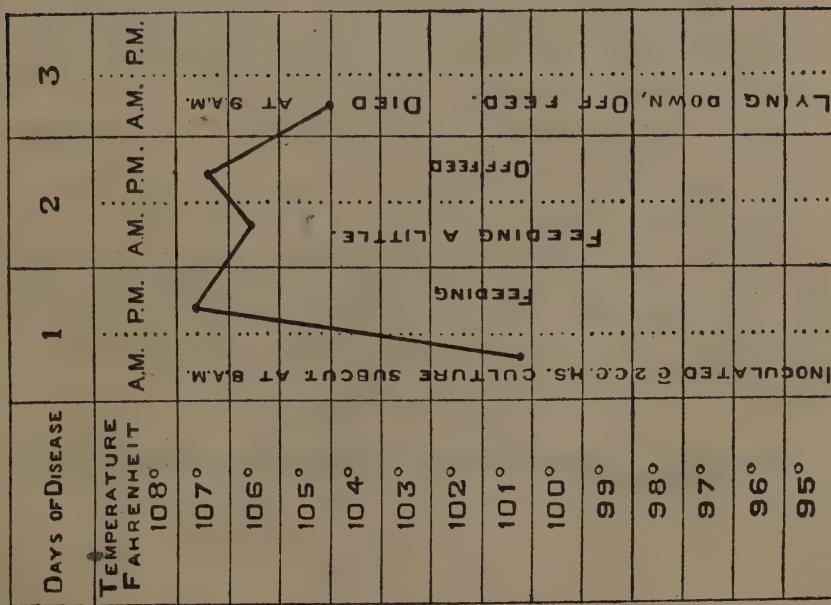
*Control No. 1.* Rabbit, inoculated with 0.5 c.c. haemorrhagic septicemia culture subcutaneously, died in 22½ hours.

Days of Disease	1	2	3	
TEMPERATURE FAHRENHEIT	A.M. P.M.	A.M. P.M.	A.M. P.M.	
108°				
107°				
106°				
105°				
104°				
103°				
102°				
101°				
100°				
99°				
98°				
97°				
96°				
95°				
INOCULATED (0.5 C.C. H.S. CULTURE SUBCUT.)				
DIED AT 6 A.M.				
SC.G.H.S. CULTURE SUBCUT. AT 8 A.M.				
108°				
107°				
106°				
105°				
104°				
103°				
102°				
101°				
100°				
99°				
98°				
97°				
96°				
95°				

**Control No. 4.** Calf, inoculated with 2 c.c. haemorrhagic septicaemia culture subcutaneously, died in 23 hours.



*Control No 3.* Calf, inoculated with 2 c.c. haemorrhagic septicaemia culture subcutaneously, died in 49 hours.



### Gaiger's Experiments.

In this connection the experiments made by Gaiger may be of interest. They are as follows:—

*Camel No. 1.* Inoculated subcutaneously with 1 c. c. emulsion of haemorrhagic septicæmia agar culture from a rabbit.

There was no apparent effect, so the animal was destroyed on the third day.

No lesions were found upon post-mortem. The control rabbit died in 15 hours.

*Camel No. 2* was inoculated subcutaneously with 1 c. c. emulsion of haemorrhagic septicæmia agar culture.

Up to the fourth day neither local nor general symptoms were shown, so the camel was destroyed, but no lesions of haemorrhagic septicæmia could be found post-mortem, nor could the bacillus be obtained from the tissues.

*Camel No. 13* was inoculated with 5 c. c. haemorrhagic septicæmia bouillon culture five days old.

Death took place 17 hours later.

On post-mortem a bloody exudate was found in the pleural cavity. The large intestines were inflamed.

This camel probably died from the effects of the toxin injected.

Cultures could not be obtained from the tissues or blood, so the bacilli probably did not multiply in the body.

*Camel No. 7* was inoculated subcutaneously with 1 c. c. haemorrhagic septicæmia bouillon culture 24 hours old.

There was no local reaction but the temperature rose to 104° F.

The control rabbit died in 18 hours.

Twenty-one days later the camel was again inoculated subcutaneously with 1 c.c. haemorrhagic septicæmia bouillon culture four days old. The control rabbit died in 20 hours. There was no general or local reaction, yet 31 days later the camel died and the bacillus was obtained in culture from the internal organs.

The bacillus was much attenuated in virulence.

**Conclusion. Camels are not very susceptible to haemorrhagic septicaemia.**

## RINDERPEST.

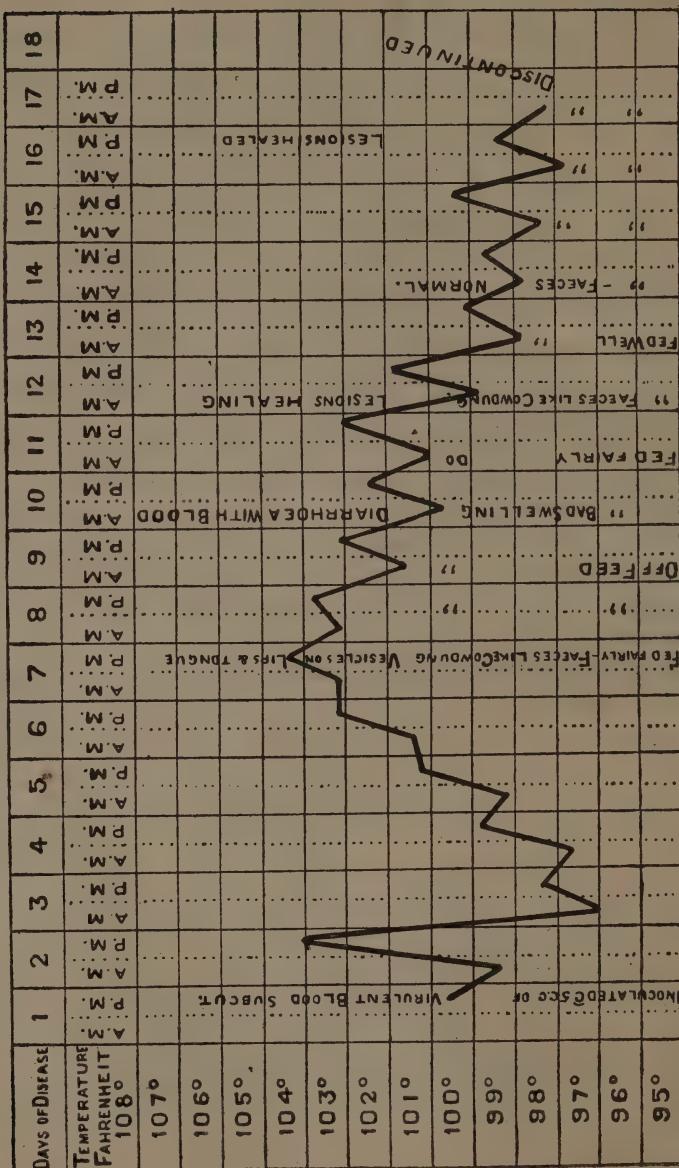
Outbreaks of rinderpest do not take place amongst camels as they take place amongst cattle. Occasionally deaths from rinderpest are reported amongst camels, but no reliable information regarding such cases is available. To determine whether camels are susceptible to the disease, three camels (one—1 year old, one—6 years old, and one—12 years old) were inoculated with rinderpest virus, and two calves 11 months old acted as controls. The 1-year old and 6-year old camels developed typical symptoms of rinderpest, but recovered, and the third (12 years old) camel with the exception of loss of appetite, slight diarrhoea, slight temperature reaction, coughing and quivering of the muscles, developed no symptoms. The two calves which acted as controls showed only a temperature reaction and loss of appetite.

The two camels that developed rinderpest lesions presented the following symptoms:—

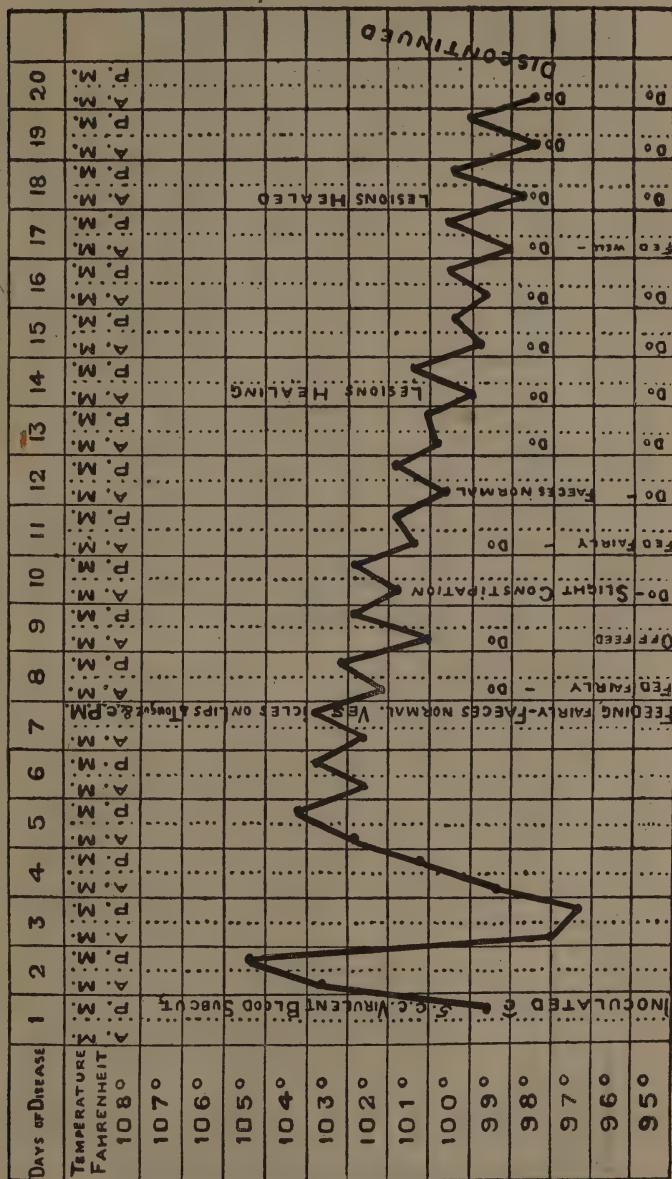
High fever, suspension of rumination, loss of appetite followed by trembling of the muscles, restlessness, watery discharge from the eyes, grinding of the teeth, coughing, and in the case of one camel bad smelling diarrhoea mixed with blood and mucus. On the sixth to seventh day after inoculation vesicles appeared on the inside of the lips, dental pad and tongue. On the sixteenth to eighteenth day after inoculation the lesions had healed.

The course that the disease runs in the camel is shown in the following charts:—

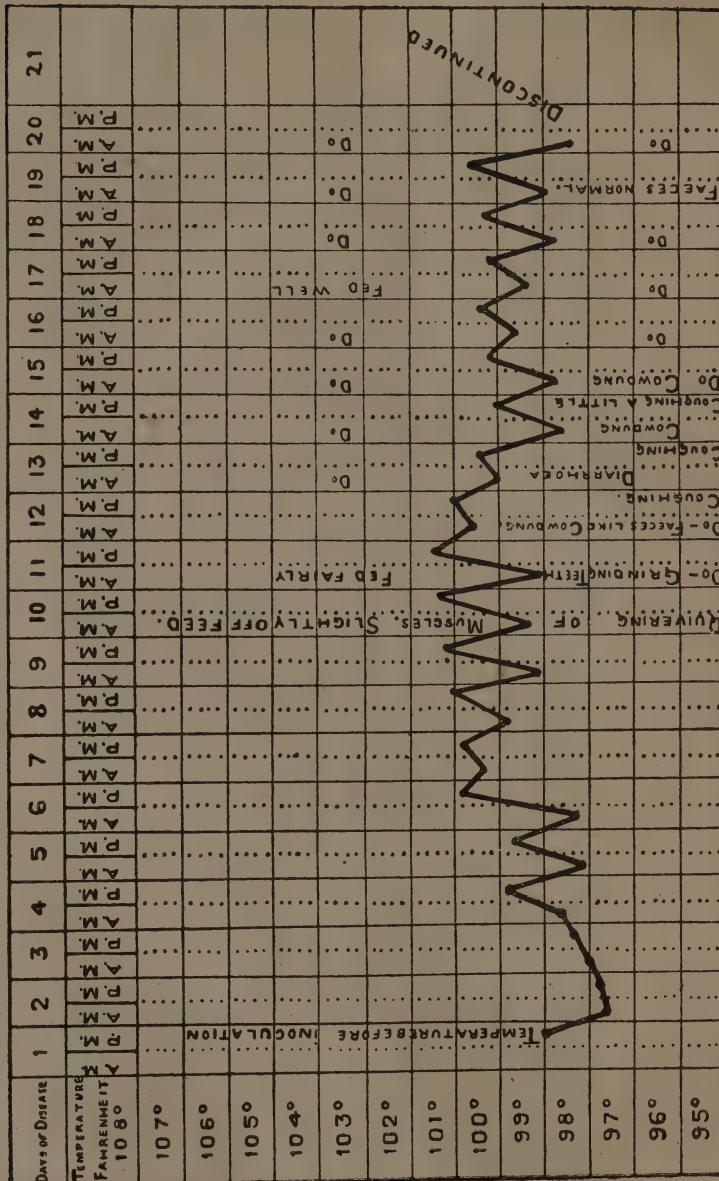
Camel No. 1. Female, 6 years old, inoculated with 5 c. c. of virulent rinderpest blood subcutaneously.



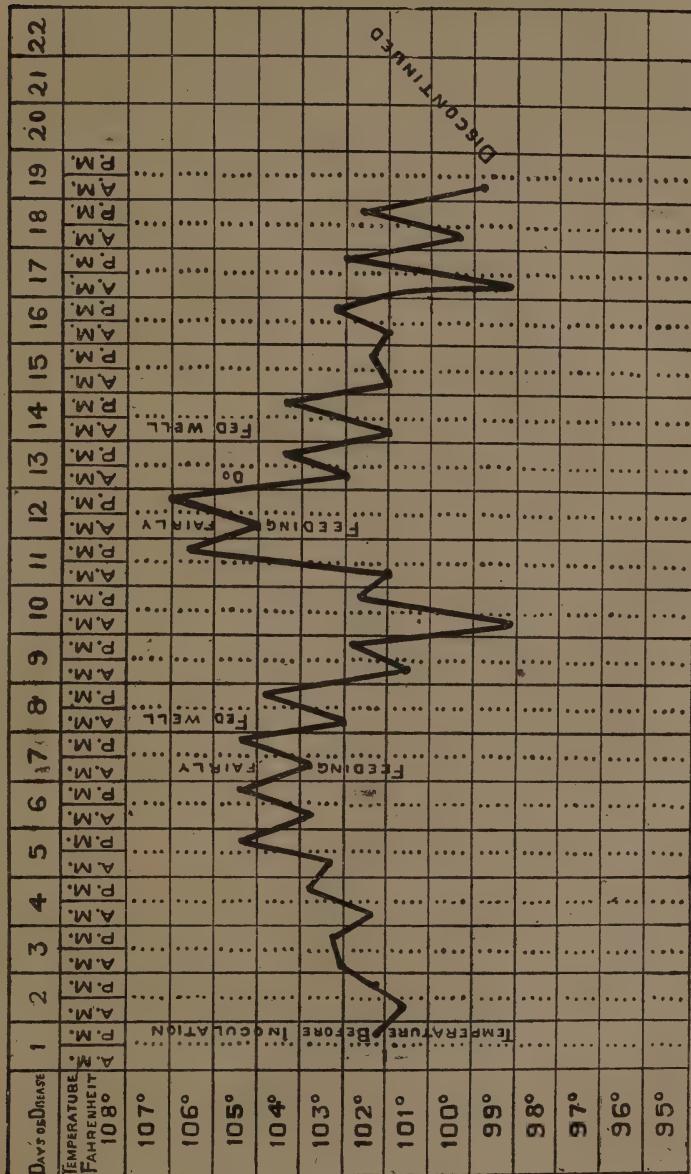
*Camel No. 2.* Female, 1 year old, inoculated with 5 c. c. of rinderpest virulent blood subcutaneously.



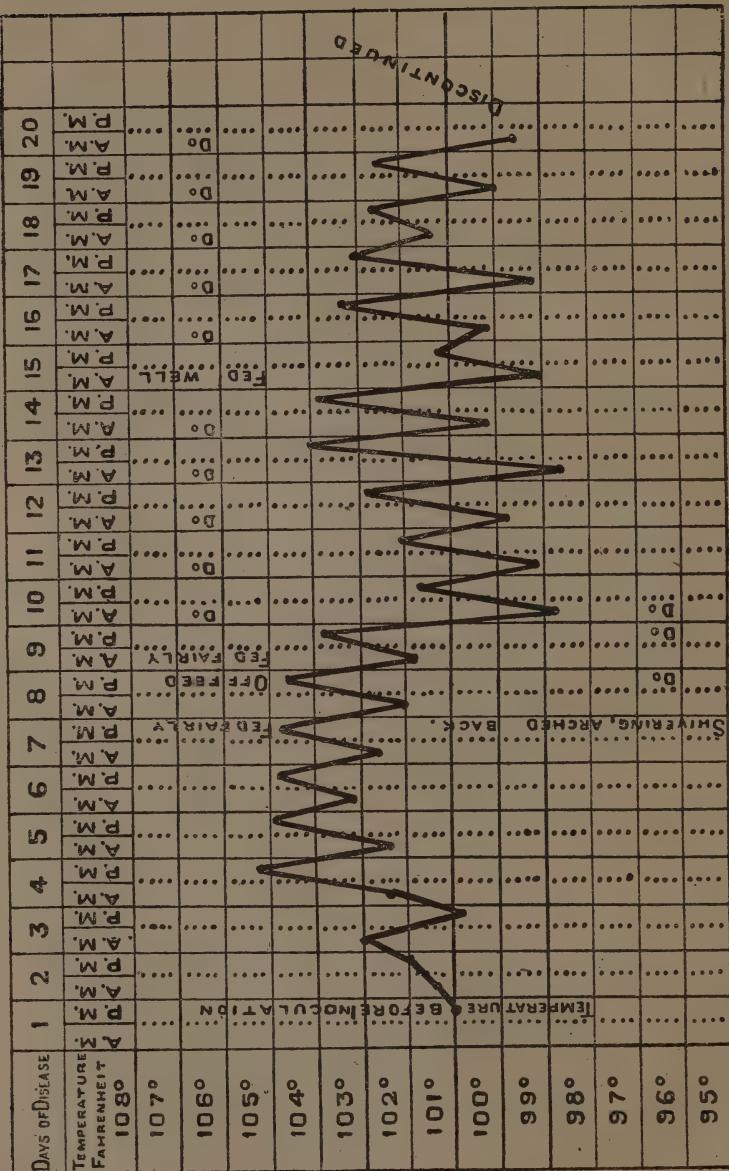
Camel No. 3. Male, 12 years old, inoculated with 5 c. c. of rinderpest virulent blood subcutaneously.



Control No. 1. Calf, 11 months old, inoculated with 5 c.c. of rinderpest virulent blood subcutaneously.



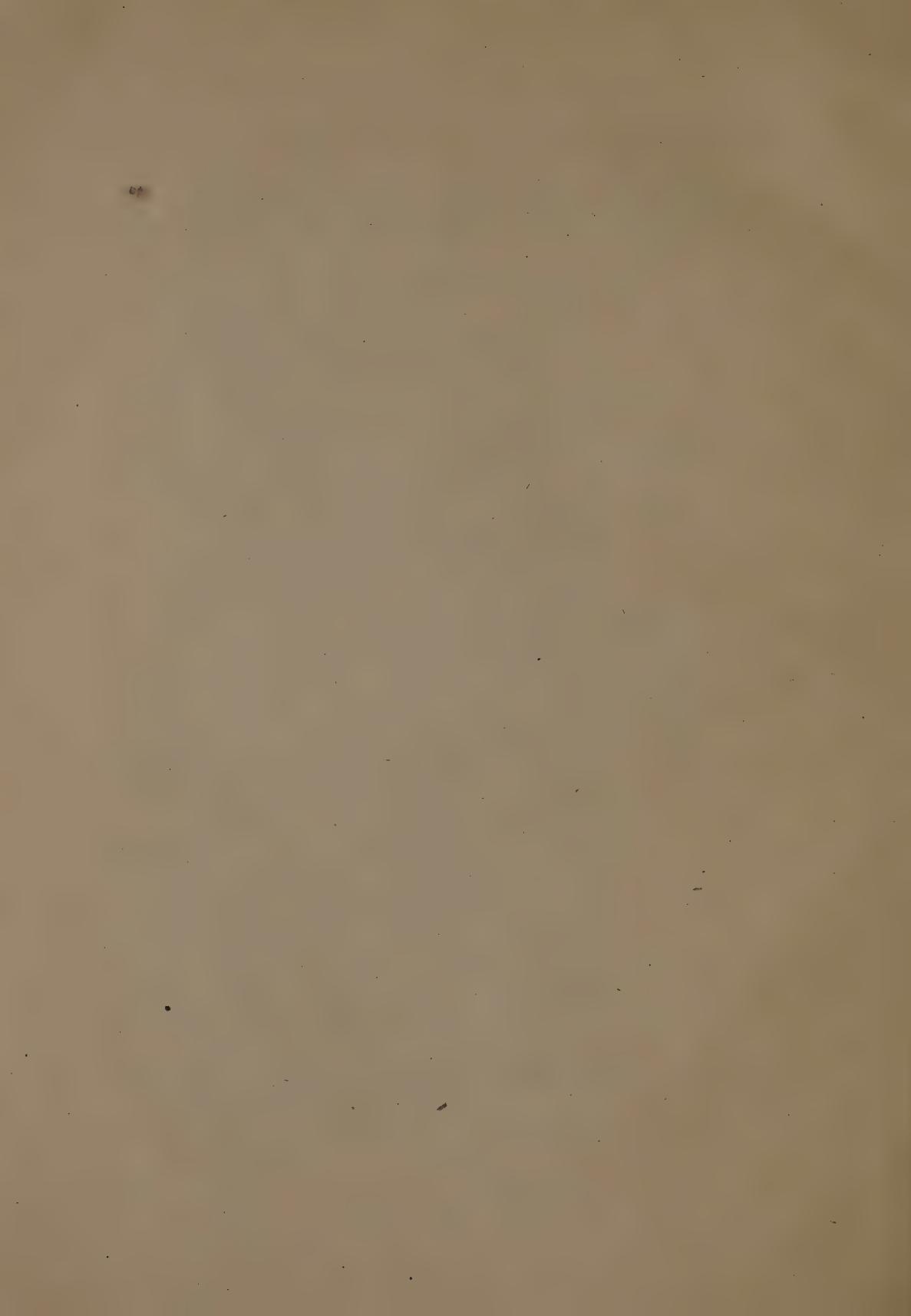
*Control No. 2.* Calf, 11 months old, inoculated with 5 c. c. of rinderpest virulent blood subcutaneously.



**Conclusions.** The only conclusions to be drawn from the above are that camels develop severe lesions of rinderpest and are more susceptible than some cattle to rinderpest.

This confirms the observations of Wiedornikow Petrowsky in Steppe Camels.





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